

**ELECTRONIC BOOK WITH
INFORMATION MANIPULATION FEATURES**

Related Applications

This application is a continuation-in-part of U.S. Application Serial No. 08/336,247 entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, filed November 7, 1994; U.S. Application Serial No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC BOOK ELECTRONIC LINKS; U.S. Application Serial No. 09/289,957, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS; U.S. Application Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 2, 1993; and U.S. Application Serial No. 08/906,469, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed August 5, 1997, which is a continuation of U.S. Application Serial No. 08/160,281, entitled TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed December 2, 1993, now U.S. Patent No. 5,798,785, dated August 25, 1998, all of which are incorporated herein by reference.

Technical Field

This invention is directed to an electronic book unit having one or more electronic books. More specifically, the invention relates to an apparatus and method for manipulating information such as text and graphics within electronic books.

Background Art

Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems, book and magazine publishers are currently only able to distribute their products in paper form. This invention solves the problems encountered by publishers.

Summary Of Invention

An electronic book viewer incorporates advanced information manipulation features that enhance the functionality of the electronic book viewer. In an embodiment, information in an electronic book including text, mathematical formulas, data, graphics, and still and moving images may be selected for manipulation. A processor in the viewer uses software modules to execute information manipulation commands. Information may be highlighted by selecting a portion of the electronic book using a cursor or similar selection device, and then sending a command to the viewer's processor to initiate the highlighting process. For example, text shown on a page of the electronic book may be selected for highlighting. Highlighting may include changing font style, size, format (bold, italics or normal), or color, for example. In the disclosure that follows, the terms information and images will be understood to refer to all manner of data, graphics, text, videos, formulas and any other information or images.

Using other software modules, the viewer's processor may be used to cut and paste, or copy and paste images from one portion of the electronic book to another portion of the electronic book. Similarly, images or content from other electronic documents can be cut and pasted, or copied and pasted into the electronic book.

The viewer's processor also may use software modules to annotate portions of the electronic book, to display the annotated portions, and to move annotations within the electronic book.

In another embodiment, the viewer may display multiple electronic books. For example, the viewer may display information or images from two electronic books in a side-by-side fashion. The two electronic books also may be displayed in a picture-in-picture format. The viewer is not limited to displaying only two electronic books, and may display three or more electronic books, using well-known image processing routines.

In yet another embodiment, the viewer may use multiple screens to display an image from a single electronic book or to display images from multiple electronic books. The multiple screens may be hinged and electronically connected to fold like pages in an

1 actual book. The multiple screens also may snap into place to form electrical
2 connections. A single image may be expanded to fit on all the multiple screens. For
3 example, a map of the world may be expanded from a single screen format to a three
4 screen format. The multiple screens may also be used to display multiple pages of the
5 electronic book. The displayed multiple pages may be consecutive or non-consecutive
6 pages within the electronic book. The multiple screens also may be used to display
7 multiple pages from more than one electronic book, or to display a page from an
8 electronic book, and information from another electronic document or information
9 source. For example, a first screen may display a page from the electronic book and a
10 second page may display a digital television signal. The second screen also may display
11 images that are linked to the page displayed on the first screen. A method and apparatus
12 for links in an electronic book are described in detail in copending U.S. Application
13 Serial No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC BOOK
14 ELECTRONIC LINKS, the disclosure of which is hereby incorporated by reference.

15 In still another embodiment, information from other sources may be displayed in
16 a picture-in-picture format on the viewer's screen. For example, a live television program
17 may be displayed in a picture-in-picture window of the screen at the same time that the
18 text of an electronic book is displayed.

19 Brief Description Of Drawings

20 Figure 1 is a block diagram of the primary components of the electronic book
21 selection and delivery system.

22 Figure 2 is a schematic showing an overview of the electronic book selection and
23 delivery system.

24 Figure 3a is a schematic of the delivery plan for the electronic book selection and
25 delivery system.

26 Figure 3b is a schematic of an alternate delivery plan.

27 Figure 4 is a block diagram of an operations center.

28 Figure 5a is a flow diagram of the processing at the operations center and uplink.

Figure 5b is a block diagram of the hardware configuration for an uplink site.

Figure 6a is a block diagram of the hardware configuration for a four component home subsystem.

Figure 6b is a schematic of a two unit home subsystem.

Figure 7 is a flow diagram of the processes performed by the video connector.

Figure 8 is a block diagram for an example of a library unit.

Figure 9 is a flow diagram of some of the processes performed by the library on the received data stream.

Figure 10 is a flow diagram of the processes performed by the library unit on information requests from the viewer.

Figure 11 is a block diagram showing the components for an example of a viewer.

Figure 12 is a flow diagram of some of the processes performed by the viewer on an information request from a subscriber.

Figure 13 is a chart depicting the menu structure and sequencing of menus in the menu system.

Figure 14a is a schematic of an introductory menu.

Figure 14b is a schematic showing an example of a main menu.

Figures 14c, 14d, 14e, 14f, 14g, 14h, 14i and 14j are schematics showing examples of submenus.

Figure 15 is a schematic diagram of an electronic book system for a bookstore or public library.

Figure 16a and Figure 16b are schematics of hardware modifications or upgrades to a set top converter.

Figure 17 is a schematic showing a set top terminal that includes a data receiver and data transmitter.

Figure 18a is a schematic of a book-on-demand system.

Figure 18b is a schematic of an operations center supporting a book-on-demand system.

1 Figure 19 is a flow chart of a process for highlighting, cutting and pasting,
2 copying and pasting, and annotating text in an electronic book.

3 Figure 20 is a schematic illustrating an example of highlighting text in an
4 electronic book.

5 Figure 21 is a schematic illustrating an example of cutting and pasting, and
6 copying and pasting, text in an electronic book or between electronic books.

7 Figure 22 is a schematic illustrating an example of annotating text in an electronic
8 book.

9 Figure 23 is a flow chart of a process for displaying multiple pages of an
10 electronic book.

11 Figure 24 is a schematic illustrating an example of viewing multiple pages in an
12 electronic book.

13 Figure 25 is a flow chart of a process for displaying one or more pages of an
14 electronic book on a viewer having multiple screens.

15 Figure 26a is a schematic illustrating a first viewer having multiple screens.

16 Figure 26b is a schematic illustrating a second viewer having multiple screens.

17 Figure 26c is a schematic illustrating presenting an image on a viewer having one
18 screen.

19 Figure 26d is a schematic illustrating presenting an image on a viewer having two
20 screens.

21 Figure 26e is a schematic illustrating presenting an image on a viewer having four
22 screens.

23 Figure 27 is a flow chart of a process for displaying picture-in-picture images of
24 electronic books.

25 Figure 28a is a schematic illustrating use of an inset image within a main image
26 for picture-in-picture viewing of electronic books.

27 Figure 28b is a schematic illustrating use of a side-by-side images for picture-in-
28 picture viewing of electronic books.

1 Figure 28c is a schematic illustrating use of an inset image within a main image
2 for picture-in-picture viewing of an electronic book and other information such as
3 graphical images or video.

4 Figure 28d is a schematic illustrating use of a side-by-side images for picture-in-
5 picture viewing of an electronic book and other information such as graphical images or
6 video.

7 Figure 29a is a schematic diagram of an electronic book home system for
8 receiving and displaying multiple signals in a picture-in-picture format.

9 Figure 29b shows the electronic book viewer displaying multiple images from
10 separate information services.

11 Detailed Description

12 An electronic book selection and delivery system provides a new way to distribute
13 electronic books to bookstores, public libraries, schools, and subscribers or users. In the
14 discussion that follows, subscribers and users will be understood to refer to an individual
15 or individuals who interface with the electronic book or any part of the electronic book
16 selection and delivery system. The technological breakthroughs of this invention provide
17 a secure system for both delivering selected electronic books and receiving payments.
18 The system has an unusual combination of features that provides the consumer with an
19 electronic book unit that has a high tech aura while being very practical, portable, and
20 easy to use.

21 The clear advantage of the system is that it eliminates the distribution of any
22 physical object such as a paper book or computer memory device from any book or text
23 distribution system. The purchase of an electronic book may become a PAY-PER-
24 READ™ event avoiding the overhead, "middle-men," printing costs, and time delay
25 associated with the current book distribution system. Published material and text such
26 as the President's speech, a new law, a court decision on abortion, or O.J. Simpson's
27 testimony can be made immediately available to the consumer at a nominal fee.

1 The system is a novel combination of new technology involving the television,
2 cable, telephone, and computer industries. It uses high bandwidth data transmissions,
3 strong security measures, sophisticated digital switching, high resolution visual displays,
4 novel controls, and user friendly interface software.

5 The primary components of the text delivery system are the subsystem for placing
6 the text onto a signal path and the subsystem for receiving and selecting text that was
7 placed on the signal path. A preferred embodiment of the system includes additional
8 components and optional features that enhance the system. The system may be
9 configured for use by bookstores, public libraries, schools and consumers.

10 The system for consumer use is made up of four subsystems, namely: (1) an
11 operations center, (2) a distribution system, (3) a home subsystem including reception,
12 selection, viewing, transacting and transmission capabilities, and (4) a billing and
13 collection system.

14 The operations center performs several primary functions: manipulating text data
15 (including receiving, formatting and storing of text data), security encoding of text,
16 cataloging of books, providing a messaging center capability, and performing uplink
17 functions. The system delivers the text from the operations center to consumer homes
18 by inserting text data into an appropriate signal path. The insertion of text is generally
19 performed with an encoder at an uplink site that is within or near the operations center.
20 If the signal path is a video signal path, the system can use several lines of the Vertical
21 Blanking Interval (VBI), all the lines of the analog video signal, a digital video signal or
22 unused portions of bandwidth to transmit text data. Using the VBI delivery method, the
23 top ten or twenty book titles may be transmitted with video during normal programming
24 utilizing existing cable, satellite, wireless or broadcast transmission capability without
25 disruption to the subscriber's video reception. Using the entire video signal, thousands
26 of books may be transmitted within just one hour of air time. Nearly any analog or digital
27 video distribution system may be used to deliver the video signal with included text.

1 The text data may also be transmitted over other low and high speed signal paths
2 including a telephone network (e.g., a public switched telephone network) having a high
3 speed connection such as an asynchronous digital subscriber line (ADSL) connection.
4 Other delivery methods and systems are described in detail in copending applications
5 U.S. Application Serial No. 09/289,957, entitled ELECTRONIC BOOK ALTERNATIVE
6 DELIVERY SYSTEMS, and U.S. Application Serial No. 09/289,956, entitled
7 ELECTRONIC BOOK ALTERNATIVE DELIVERY METHODS, both filed April 13,
8 1999, the disclosures of which are hereby incorporated by reference.

9 The home subsystem performs four primary functions: connecting to the video
10 distribution system, selecting text, storing text, and transacting through a phone or cable
11 communicating mechanism. The components of the home subsystem may be configured
12 in a variety of hardware configurations. Each function may be performed by a separate
13 component, the components may be integrated, or the capability of existing cable set top
14 converter boxes and televisions may be utilized. Preferably, a connector, library unit and
15 an electronic book unit, or viewer unit, are used. The connector portion of the home
16 subsystem receives the analog video signal and strips or extracts the text from the video.
17 The home library stores the text signal, provides a user friendly software interface to the
18 system and processes the transactions at the consumer home. The viewer provides a
19 screen for viewing text or menus and novel user friendly controls. The viewer may also
20 incorporate all the functionality of the home subsystem.

21 The viewing device is preferably a portable book shaped viewer which stores one
22 or more electronic books for viewing and provides a screen for interacting with the home
23 library unit. A high resolution LCD display is used to both read the books and to interact
24 with the home library software. An optional phone connector or return-path cable
25 connection initiates the telephone calls and, with the aid of the library, transmits the
26 necessary data to complete the ordering and billing portion of the consumer transaction.
27 The user friendly controls include a bookmark, current book and page turn button. The
28 billing and collection system performs transaction management, authorizations,

1 collections and publisher payments automatically utilizing the telephone system.
2 Alternative ordering and billing methods and systems are described in detail in copending
3 applications U.S. Application Serial No. 09/289,957, filed on April 13, 1999, entitled
4 ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS, and U.S. Application
5 Serial No. 09/289,956, filed on April 13, 1999, entitled ELECTRONIC BOOK
6 ALTERNATIVE DELIVERY METHODS.

7 In an embodiment, the primary components of the electronic book selection and
8 delivery system 200 are an encoder 204, a video distribution system 208, a connector 212,
9 and a text selector 216 as shown in Figure 1. The encoder 204 places textual data on a
10 video signal to form a composite video signal. Although the composite signal may
11 contain only textual data, it usually carries both video and textual data. A variety of
12 equipment and methods may be used to encode text data onto a video signal. The video
13 distribution system 208 distributes the composite video signal from the single point of
14 the encoder 204 to multiple locations which have connectors 212. The connector 212
15 receives the digital or analog video signal from the video distribution system 208 and
16 separates, strips or extracts the text data from the composite video signal. If necessary,
17 the extracted text data is converted into a digital bit stream. Text selector 216 works in
18 connection with the connector 212 to select text.

19 Using a connector 212 and text selector 216 combination, various methods of
20 selecting and retrieving desired text from a composite or video signal are possible. Text
21 may be preselected, selected as received or selected after being received and stored. A
22 preferred method is for the connector 212 to strip or extract all the text from the video
23 signal and have the text selector 216 screen all the text as received from the connector
24 212. The text selector 216 only stores text in long term or permanent memory if the text
25 passes a screening process described below.

26 An overview of the electronic book selection and delivery system 200 is shown
27 in Figure 2. The delivery system 200 includes: an operations center 250 including an
28 uplink site 254, a video distribution system 208, a home system 258 including a video

1 connector 212, a library 262, a viewer 266, and a phone connector 270, telephone system
2 274, an internet web site 279 and a billing and collection system 278. Also as shown in
3 Figure 2, the home system 258 may include connections to a television 259 and a
4 personal computer 261. The television 259 and the personal computer 261 may be used
5 to display menu screens, electronic books, electronic files, or any other information
6 associated with the delivery system 200. In addition, the television 259 and the personal
7 computer 261 may provide control function that replicate and supplement those of the
8 viewer 266.

9 The operations center 250 receives textual material from outside sources 282 such
10 as publishers, newspapers, and on-line services. Alternately, the outside sources may
11 maintain electronic books at the Internet web site 279. The outside sources 282 may
12 convert textual and graphical material to digital format, or may contract with another
13 vendor to provide this service. The operations center 250 may receive the textual and
14 graphical material in various digital formats and may convert the textual material to a
15 standard compressed format for storage. In so doing, the operations center 250 may
16 create a pool of textual material that is available to be delivered to the home system 258.
17 The textual material may be grouped by books or titles for easy access.

18 As used herein, "book" means textual or graphical information such as contained
19 in any novels, encyclopedias, articles, magazines or manuals. The term "title" may
20 represent the actual title assigned by an author to a book, or any other designation
21 indicating a particular group, portion, or category of textual information. The title may
22 refer to a series of related textual information, a grouping of textual information, or a
23 portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading
24 Books (Ages 10-12)", "Encyclopedia 'BRITANNICA'™", "President's Speech",
25 "Instruction Manual", "Schedule of 4th of July Events", "Pet Handbooks", "Roe v.
26 Wade", and "The Joy of Cooking" are suitable titles. Also, the title may be a graphical
27 symbol or icon. Thus, a picture of a wrench may be a title for a repair book, a picture of
28 a computer a title for a computer book, a graphical symbol of a telephone a title for a

1 telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and
2 ball a title for a sports book and a picture of tickertape a title for a business book. The
3 term "electronic book" refers to the electronic counterpart to a "book."

4 The operations center 250 includes an uplink site 254 for placing the text onto a
5 video signal and sending the composite video signal into a video distribution system. The
6 uplink site 254 would generally include an encoder 204 (not shown in Figure 2) to encode
7 the text onto a video signal.

8 Many analog and digital distribution systems 208, or other telecommunications
9 systems, can be used with the delivery system 200, such as a cable television distribution
10 system, a broadcast television distribution system, video distributed over telephone
11 systems, distribution from the Internet, direct satellite broadcast distribution systems, and
12 other wired and wireless distribution systems.

13 The home system 258 performs five primary functions: (1) connecting with a
14 video distribution system, (2) selecting data, (3) storing data, (4) displaying data, and (5)
15 handling transactions. An important optional function of the home sub-system 258 is
16 communicating using a telephone communication system 274. The home system 258 is
17 made up of primarily four parts: a video connector 212 or similar type of connector for
18 connecting with the video distribution system 208, a library unit 262 for storing and
19 processing, an electronic book, or viewer unit, 266 for viewing menus and text and a
20 telephone connector 270 for connecting with a telephone communications system 274.
21 In an alternate arrangement, the viewer 266 may include all the functionality of the home
22 system 258.

23 The billing and collection system 278 may be co-located with the operations
24 center 250 or located remote from the operations center 250. In an embodiment, the
25 billing and collection system 278 is in communication with the home system 258 via
26 telephone-type communication systems (for example 274). Any of a number of telephone
27 type communication systems, such as, a cellular system, will operate with the billing and
28 collection system 278. The billing and collection system 278 records the electronic books

1 or portions of text that are selected or ordered by the subscriber. The collection system
2 will charge a subscriber's credit account or bill the subscriber. In addition, the billing and
3 collection system 278 will monitor that amount due to publishers or other outside sources
4 282 who have provided textual data or other services such as air time to enable the text
5 delivery system 200 to operate.

6 When electronic books are provided via the Internet web site 279, the billing and
7 collecting functions may be incorporated into the Internet web site 279. For example, a
8 subscriber may pay for an electronic book selection by entering a credit card number into
9 a data field of a page of the Internet web site 279. In this configuration, a separate billing
10 and collection system may not be required.

11 Figure 3a is an expanded overview of a delivery plan 301 for the delivery system
12 200. The delivery plan 301 supports various types of subscribers and various billing
13 systems. Figure 3a shows that publishers 282 will provide text transfer 302 to the
14 operations center 250' and receive payments 306 from the billing and collection system
15 278'. A separate channel uplink site 254' is shown in this configuration receiving data
16 310 from the operations center 250'. The operations center 250' has three separate
17 sections (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for
18 security encoding 322 and a third section for catalog and messaging center functions 326.

19 The billing and collection system 278' shown has two sections (330, 334) one for
20 transaction management, authorizations and publisher payments 330, and the other for
21 customer service 334. The customer service section 334 provides for data entry and
22 access to customer account information. Transaction accounting information 338 is
23 supplied to credit card companies 342 by the transaction management section 330 of the
24 billing and collection system 278'. The credit card companies 342 provide billing 346 to
25 customers either electronically or by mail.

26 Three methods for communicating between the subscriber base 348 and the
27 billing and collection system 278' are shown: by telephone switching 350 alone, cellular
28 switching 354 and telephone switching 350 combined, and by use of the cable system 358

1 and the telephone switching 350. The system shown supports both one-way 362 and two-
 2 way cable communication 366 with subscribers. Public libraries and schools 370 as well
 3 as bookstores 374 may use the delivery system 301.

4 Public libraries and schools 370 would have a modified system to allow the
 5 viewer 266 to be checked-out or borrowed while bookstores 374 would rent or sell the
 6 viewer 266 and sell the electronic books. The bookstores 374 as well as the public
 7 libraries and schools 370 may be serviced by cable 378. Optional direct broadcast
 8 systems (DBS) 382 can also be used with the delivery system 200. The DBS 382 may
 9 provide the electronic books using digital satellite technology, with the electronic books
 10 being received via a backyard satellite antenna, for example.

11 Figure 3b is an alternate delivery plan 301' that provides for electronic book
 12 selection and delivery using the Internet. In Figure 3b, the publishers 282 provide the
 13 electronic books to be posted at the Internet web site 279. The publishers may convert
 14 the text and graphical data to digital format, compress the digital data, and upload the
 15 compressed digital data to the Internet web site 279. Alternately, the publishers 282 may
 16 arrange for an outside conversion activity 283 to convert the text and graphical data to
 17 digital format. The conversion activity 283 may then provide the digital data to the
 18 Internet web site 279. For example, a large on-line bookstore could gather publications
 19 in electronic form from a variety of publishers, or could convert hard-copy books to
 20 electronic form, and post the electronic books on the Internet such as at the Internet web
 21 site 279.

22 The electronic books may then be transferred via a public switched telephone
 23 network (PSTN), for example, direct to a subscriber 285, a library 286 and a bookstore
 24 287. The library 286 and the bookstore 287 may also provide electronic books to the
 25 subscriber 285.

26 I. The Operations Center

27 Figure 4 is a schematic of an operations center 250 which includes an uplink 254.
 28 The operations center 250 gathers text or books by receiving, formatting, storing, and

1 encoding. A data stream 302 containing text is received at the operations center 250 by
2 a data receiver 402. The data receiver 402 is under the control of a processor 404. After
3 reception, the data stream is formatted using digital logic for formatting 406 which is also
4 under the control of the processor 404. If any additional text is being generated at the
5 operation center 250 locally for insertion into the distributed signal, the text generation
6 is handled through text generator hardware 410 which may include a data receiver and
7 a keyboard (not shown). Following processing by the text generator 410, the additional
8 text can be added to the text received by the combining hardware 414 that includes digital
9 logic circuitry (not shown).

10 The processing at the operations center 250 is controlled by a processor 404
11 which uses an instruction memory 416. The processor 404 and instruction memory 416
12 may be supplied by a personal computer or mini-computer. To perform the catalog and
13 messaging functions, the operations center 250 uses a catalog and message memory 420
14 and the text generator 410 if necessary.

15 The data stream of text, catalog and messages is preferably encoded by security
16 module encoding 424 prior to being sent to the uplink module 254. Various encoding
17 techniques may be used by the security encoding module 424 such as the commercial
18 derivative of NSA's encryption algorithm (Data Encryption System (DES)) and General
19 Instrument's DigiCipher II. Following encoding, the encoded text may be stored in text
20 memory 428 prior to being sent to the uplink 254. A first-in-first-out text memory
21 arrangement may be used under the control of the processor 404. Various types of
22 memory may be used for the text memory 428 including RAM. The operations center
23 250 may use file server technology for the text memory 428 to catalog and spool
24 electronic books for transmission as is described below.

25 To transmit textual data (i.e., electronic books), the delivery system 208 uses high
26 bandwidth transmission techniques such as those defined by the North American
27 Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard.
28 Using the WST format (where each line of the Vertical Blanking Interval contains 266

1 data bits), a four hundred page book, for example, may be transmitted during
2 programming using four lines of the Vertical Blanking Interval at a rate of approximately
3 one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may
4 be transmitted over a dedicated channel, which interrupts programming so that 246 lines
5 of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per
6 second). A teletext type format is the simplest but possibly the slowest text format to use
7 with the delivery system 200. In either event, an encoder 204 is utilized at an uplink site
8 254 to insert textual data into the analog video signal. In many other respects, the
9 delivery of the textual information is completed using existing cable television plant and
10 equipment.

11 Figure 5a is a flowchart of the steps involved in processing text from the publisher
12 or provider 282 that occurs at the operations center 250. As shown in block 500, the
13 publisher 282 processes data files of text for books, compresses, encrypts and sends the
14 data files to the operations center 250 or uplink 254. Text files for books are preferably
15 sent one book at a time. As shown in block 504, the uplink 254 or operations center 250
16 receives and processes the data stream from the publisher 282. Generally, part of this
17 processing includes encryption and error correction.

18 As shown in block 508, files are broken into smaller packets of information.
19 Header information is added to the packets. The bit stream is converted from a serial
20 digital bit stream to an analog bit stream that is compatible with an NTSC video signal.
21 Block 512 shows the switching of analog data into the video lines of a video signal. The
22 analog data is generally placed either in the VBI or the active video lines. In some
23 instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40
24 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

25 Figure 5b is an example of a hardware configuration to perform some of the
26 functions for blocks 508 and 512. A video feed 516 is received and processed through
27 a sync stripper 520. The stripped sync signal 532 is used by the digital logic control 524.
28 The digital logic control 524 receives the sync signal 532 and a serial digital bit stream

1 528 for processing. The digital logic control 524 passes the serial digital bit stream to the
2 Digital to Analog converter 536 and outputs a control signal 540 for the video switch
3 544. The video switch 544 integrates the video feed 516 and analog data stream 548 into
4 a video feed with analog data signal inserted 552.

5 As an alternative to cable, satellite, broadcast, or other television delivery
6 methods, the public telephone system may be used to transmit books to the subscribers.
7 An average electronic book would take about 7 minutes to transmit over the public
8 telephone system. Using the telephone system, it is not necessary to combine video and
9 text into a composite signal. In most other respects, the operation center would remain
10 similar whether text delivery was by telephone or cable. File server technology (such as
11 that described in U.S. Patent No. 5,262,875, entitled AUDIO/VIDEO FILE SERVER
12 INCLUDING DECOMPRESSION/PLAYBACK MEANS, issued to Mincer, et al., and,
13 U.S. Patent No. 5,218,695, entitled FILE SERVER SYSTEM HAVING HIGH-SPEED
14 WRITE EXECUTION, issued to Noveck, et al., incorporated herein by reference) may
15 be used at the operation center with a telephone system text delivery method.

16 As another alternative to cable, television, and telephone system delivery, the
17 public telephone system may be used to provide access to the Internet, where the Internet
18 web site 279 may be accessed. Electronic books may be ordered, paid for, and delivered
19 directly from the Internet web site 279 over the telephone system.

20 In any delivery system using the telephone system, individual subscribers may
21 increase the electronic book deliver rate by incorporating high speed modems or other
22 communication devices such as an Integrated Services Digital Network (ISDN)
23 connector, or by use of an Asymmetric Digital Subscriber Line (ADSL)

24 II. The Home System

25 The hardware configuration for a four component home system 258 is shown in
26 Figure 6a. Figure 6b shows a hardware configuration for a two component home system.
27 The hardware components may also be incorporated into a single unit that communicates
28 with a terminal in a television delivery system or with a telephone system by use of a

1 modem, for example. The home system 258 performs several functions, such as
2 receiving data and video transmissions, stripping (or extracting) the data from the video
3 signal, screening and storing the data, providing user friendly interface controls and
4 software, displaying menus and text, processing transactions, initiating telephone calls
5 and transmitting billing data. Various hardware configurations may be utilized to achieve
6 the desired functions of the home system 258. For example, as shown in Figure 6b, the
7 home system 258 can be configured to utilize the reception and channel tuning capability
8 of the current installed subscriber base of cable converter boxes and televisions 601. The
9 home system 258 can also be designed as an advanced set top terminal converter box
10 with menu generation capability, electronic memory and a telephone modem as described
11 in section V below.

12 The electronic components which make up the home system 258 can be arranged
13 in a variety of ways. In the four unit system of Figure 6a the viewer 266 and library unit
14 262 are wired together while the remaining components communicate through RF
15 transceivers 604. In a simple version of the home system 258 there are only two units,
16 the library unit 262 and a viewer 266. Figure 6b shows a two unit home system 258 with
17 certain optional features. Finally, all the functionality of the home system 258 may be
18 incorporated into one electronic book unit, or viewer.

19 The viewer 266 is generally equipped with a high resolution viewing area 602,
20 digital logic (including a key 605, security 606, and a microprocessor 621), video
21 graphics control and memory 607, power supply circuitry 602 (not shown), an optional
22 battery 603 and an optional RF transceiver 604. In a two unit arrangement, the library
23 unit 262 contains the connector function to the video distribution system 208, connector
24 function to a public telephone communications system, and memory 600 (which may be
25 removable and portable 600'). More specifically, the library unit 262 would include data
26 stripping functions 617, digital logic 609, memory storage 600, power circuitry 610,
27 optional telephone connections 611 (including cellular or PCN 611'), optional battery (not
28 shown), optional tuner module 613 and an optional RF transceiver 604. The video

1 connector 212 and the public telephone system connection 270, as well as the removable
2 portable memory unit 600 of the library unit 262 may be broken out into separate
3 components. (Figure 6b shows a removable portable hard disk memory 600' with
4 removable cartridges 614.) Finally, the home system 258 may include an attached
5 keyboard 267 or a wireless keyboard 268. Both the attached keyboard 267 and the
6 wireless keyboard 268 may be used to communicate with the viewer 266 (not shown) or
7 the library unit 262.

8 The wireless keyboard 268 may communicate via radio frequency (RF) signaling,
9 for example. Therefore, the home system 258 may have as many as six separate
10 components which communicate with each other. The two, three, four, five or six
11 separate components which make up the home system 258 can communicate with each
12 other in a variety of ways, including hardwired connection 615, RF transceiver 604, and
13 other wireless methods.

14 RF communications are preferred in the home because they allow separate
15 components to be located throughout the home without restriction. The data
16 communicated between the units is preferably secure data. In addition, the library unit
17 262 may provide power to the viewer 266 through the hardwired connection 615.

18 Alternatively, a single unit may perform all of the home system 258 functions.
19 The single unit should use light-weight materials, including a light-weight battery. A
20 single unit eliminates the need to communicate (externally) between units. The single
21 unit is less expensive and eliminates duplicative processing, memory storage and power
22 circuitry.

23 To receive and strip the data from the video signal at the consumer's home, either
24 a cable interface device or cable connector 212 is used. The cable connector device
25 includes a tuner 613, while the cable interface device makes use of existing tuning
26 equipment in the home. In either configuration, data is stripped from the video signal
27 and stored at the subscriber's location in the library unit 262. The phone connector 270,
28 and modem 611 initiate telephone calls and transmit ordering and billing information to

the operations center 250 or billing and collection system 278. Alternatively, the phone connector 270 and the modem 611 may be used to provide access to the Internet to order and receive electronic books from an Internet web site. A digital connector 619 is provided to communicate digital information with the set top 601. The library unit 262 is the intelligent component of the home system, incorporating the hardware and software necessary to store the text data, generate menus and effect the purchase transactions. In addition to an RF transceiver 604, the library unit 262 also includes the necessary jacks and connections to allow the delivery system 200 to be connected to the viewer 266. As shown in Figure 6b, the library 262 communicates the text data (electronic book) to the viewer 266 in a secure format which requires a key 605 for decryption. The text is generally only decrypted page by page just before viewing.

a. The Video Connector

Figure 7 shows the flow of the processes performed by the video connector 212. The video connector receives the video signal 608, tunes to the channel containing the text data 612, strips the text data from the video signal 616, and communicates the text data stream to logic components in the library 620.

The connection to the video distribution system is preferably a cable connector to a cable television delivery system, as shown in Figure 6b. The cable connector includes a data stripper circuit 617, which accepts video input from either a set top converter, TV or VCR 601, or an optional tuner block 613 that receives the CATV signal through the cable connector 212'. The data stripper circuit 617 strips data out of the video, and outputs a digital bit stream to the digital logic portion 609 of the library unit 262. The data is embedded in the video signal either in the vertical blanking interval or the active video portion in an encrypted and compressed format. The data stripper circuit 617 can be placed inside the set top converter box 601, TV, or in the library unit. The data stripper circuit 617 outputs the digital bit stream to be used by the library digital logic 609.

1 The video connector 212 may also contain a channel tuner module 613 that can
2 tune to the video channel and provide access to the video that contains the data to be
3 stripped. Using the optional tuner module 613, a set top converter, VCR, or TV tuner is
4 not needed in the home system. The optional tuner module 613 would instead receive
5 the CATV signal directly through the cable connector 212.

6 b. Library

7 An embodiment of the library unit 262 for a two unit home system 258 is shown
8 in both Figure 6b and Figure 8. The embodiment shown includes the following optional
9 parts: the video connector 212, phone connector 270, RF transceiver 604, and battery
10 pack 624 in addition to a removal portable memory 600', microprocessor 628, instruction
11 memory unit 632, digital logic 636, and power unit 640.

12 The library unit 262 contains a digital logic section 609 (not shown in Figure 8)
13 which includes the microprocessor 628, the digital logic 636 and the instruction memory
14 unit 632. The microprocessor 628 is preferably a secure microprocessor such as the Mot
15 SC21 device sold by Motorola. The digital logic section 609 will receive the serial digital
16 bit stream from the data stripper circuit 617 and process the data. Error correction will
17 also be performed by the digital logic section 609 and the data will be checked for proper
18 address. If the address of the data is correct and the library unit 262 is authorized to
19 receive the data, the data will be transferred to the memory storage unit 600, 600'.
20 Authorization to receive the data is provided by the cable headend or another distribution
21 point. An authorization code may be sent in the serial digital bit stream. The digital logic
22 section 609 will send appropriate text and graphical data to the memory storage unit 600,
23 600'. It transfers this data in a compressed and encrypted format and the data remains
24 stored in a compressed and encrypted format.

25 i. Memory Storage Unit

26 The memory storage unit of the library may be a removable portable memory unit
27 600' (as shown in Figures 6a, 6b and 8). A variety of options are available for memory
28 storage: a hard disk drive, a hard disk with removable platters, and a CD ROM, or a

1 MEMORY STICK™. Referring to Figure 6b, a hard disk drive unit 600' which contains
2 removable platters may also be used. This would provide virtually unlimited library
3 storage capacity. Data (i.e., electronic book files) may be stored in the memory storage
4 unit in a compressed and encrypted format. As is also shown in Figure 6b, the data may
5 also contain a key or unique ID number that matches the ID or key of the viewer 266.
6 This matching of a unique key or ID number prevents unauthorized transfer of text data
7 from the memory storage unit to an unauthorized viewer. Small memory devices such
8 as smart cards, electronic memory cards or PCMCIA cards (personal computer memory
9 card industry association) may also be used to store the data.

10 ii. Power Circuitry

11 As shown in figures 6b and 8, the library unit 262 may accept power from either
12 AC wall power 610, DC power 640, or optional battery power 624. The power circuitry
13 610, 640 may provide all the voltage necessary from either the battery 624 or AC unit for
14 the various circuitry in the library. The power circuitry 610, 640 may also provide power
15 to the viewer 266 through a single data cable when connected to the viewer. The power
16 circuitry 610, 640 will recharge the battery using AC power when in operation. With the
17 optional battery unit 624 installed, the library unit 262 becomes a portable unit and can
18 still provide power to the viewer 266. In order to extend battery life, power conservation
19 measures may be utilized, such as shutting down the memory system when not in use.
20 When the viewer 266 is being utilized and the library circuitry is not being utilized,
21 virtually all power may be shut down to the library unit 262.

22 iii. Connection to the Public Telephone System

23 The connection to the telephone system may be provided by a modem 611.
24 Various available modems may be used to perform this function. As shown in Figure 6b,
25 cellular phone or PCN phone connections 611' may also be provided. When the home
26 system 258 is first initialized, the modem may be used to transfer the name and credit
27 card information of the consumer to the billing and collection system 278. The telephone
28 connection 270 may be utilized each time an electronic book is purchased by a consumer

1 to complete and record the transaction. The telephone connection 270 may also be used
2 as a means for receiving the electronic books from the operations center 250 or from an
3 Internet web site, by-passing the video distribution system 208. The phone connection
4 270 may be a separate unit as shown in Figure 6b.

5 iv. Library Processing

6 Figure 9 shows an example of some basic processing performed by the library unit
7 262 on the data stream 651 received from the video connector 212 or stripper circuit 617.
8 First the data stream 651 is checked for error correction by block 650. If an error is
9 detected, block 654 de-interleaves the data followed by block 658 running a FEC
10 (Forward Error Correcting) algorithm. The combination of block 650, 654 and 658
11 perform the error correction needed on the data stream. If no error correction is necessary
12 the data proceeds to block 662 where packets are individually checked for packet address.

13 If the address is a unique address, block 666 checks whether the address of the
14 packet matches the library box ID number. The library box ID number is a unique
15 number associated with that library unit 262 which is used to ensure security of the data.
16 Block 670 determines whether an electronic file has already been opened into which the
17 data packet can be saved. If no data file has been opened then block 674 opens a new
18 data file for that packet. If an electronic file has been opened, then the packet is saved
19 in that electronic file on disk, block 678. Next, the process checks to see if this is the last
20 packet for a particular book for a particular textual data block being received 682. If it
21 is the last packet of information, then the electronic file is closed and the directory of
22 available electronic files is updated 686. Following either block 682 or 686, the process
23 returns to receive another data packet from the data stream received from the data stripper
24 block.

25 If the packet address is checked and the address is determined to be a broadcast
26 address, the process determines the type of message that is being sent 690. The message
27 may be an index of book titles, menu (and menu graphics) information, announcements,
28 special offerings, discounts, promotions, previews etc. The message is then stored in

1 appropriate electronic message file 694 and the process is returned to block 650 to receive
2 another data packet and perform another error check.

3 Using the process of Figure 9, the library unit 262 is able to receive, store and
4 update directories related to the textual data and graphical data (that can be used to depict
5 pictures in a given book or to generate menus). Variations of the processes are possible
6 depending on the format of the data and operating system of the library unit 262.

7 Figure 10 shows an example of the processing of information requests from the
8 viewer 266 at the library unit 262. Information requests from the viewer 266 are received
9 either through the cable connecting the viewer 266 to the library unit 262 or through
10 wireless transmissions such as RF. It is possible in some embodiments for subscribers'
11 requests to come from a set top terminal 602 (see Section V).

12 Information requests received from the viewer 266 generally fall into three
13 categories: (1) directory data of electronic books stored in the library unit 262, (2) index
14 of all available electronic books on the system, and (3) requests for a specific electronic
15 book (Block 700). A get directory process 704 answers a request from the viewer 266
16 for a directory of data showing the electronic books stored at the viewer 266. The
17 directory of data is sent to the viewer 266 so that it may be displayed to the subscriber.
18 A get index process 708 handles requests from the viewer 266 for an index of all
19 available electronic books on the home system 258. The library unit 262 will obtain an
20 index of all the available books on the system and transmit that index, process 712, with
21 menu information to the viewer 266. An open file process 716 replies to a request from
22 the viewer 266 for a specific electronic book. The library unit 262 opens an electronic
23 file for the specific electronic book requested by the viewer 266 and transmits the record
24 or transmits the information 720 on a packet-by-packet basis to the viewer 266. This
25 process of transmitting the specific electronic book, record, or packets to the viewer 266
26 continues until the last record or packet has been sent, 724.

27 In addition to the processes shown on Figure 10 in handling a request for a
28 specific electronic book, the library unit 262 also orders and receives specific electronic

1 books from the operations center 250 using the process as described in the open file
2 process 716. Following a request for a specific electronic book which is not stored at the
3 library unit 262, the library unit 262 will proceed to determine the next available time the
4 electronic book will be on the video distribution system 208 and ensure reception and
5 storage of that electronic book (process not shown). In performing this process the
6 library unit 262 will transmit to the viewer 266 information on when it will obtain the text
7 data for the electronic book so that the subscriber may view the electronic book. In
8 addition to timing information, price and other ordering information may also be passed
9 by the library unit 262 to the subscriber.

10 c. The Viewer

11 Figure 11 is a block diagram of the viewer 266 showing its internal components.
12 The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The
13 viewer 266 is designed to physically resemble a bound book. The viewer 266 is made
14 up of five primary components and six optional components: (1) LCD display 602, (2)
15 digital circuitry (not shown), (3) video graphics controller 607', (4) controls 740, (5) book
16 memory 728, (6) optional power supply circuitry 736, (7) optional battery 603', (8)
17 optional RF transceiver 604, (9) optional cellular or mobile communicator (608), (10)
18 optional keyboards 267 and 268, and (11) a speaker/microphone 608'.

19 (1) A high resolution LCD screen 602, preferably of VGA quality, is used by
20 the viewer 266 to display text and graphic images. The screen is preferably the size of
21 one page of a book. A two page screen or two screens may also be used with the viewer
22 266.

23 (2) Digital circuitry that includes a secure microprocessor 621, instruction
24 memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and
25 encrypted format. The secure microprocessor 621 compares the ID number of the viewer
26 266 with the incoming data stream and only stores the text data if the ID number of the
27 viewer 266 matches that within the incoming data stream. It is preferred that the viewer
28 266 not output text data or other data and that the data is decompressed and decrypted

1 only at the moment of viewing and only for the current page being viewed. These
2 measures are preferred because they provide additional security against unauthorized
3 access to data.

4 (3) A video graphics controller 607' that is capable of assisting and displaying
5 VGA quality text and graphic images is included in the viewer 266. The graphics
6 controller 607' is controlled by the digital circuitry described above. Text may be
7 displayed in multiple font sizes.

8 (4) The viewer 266 of Figure 11 has touch panel controls 740. These unique
9 and novel controls 740 allow the consumer to select stored electronic books and
10 electronic books from catalogues, move a cursor, and turn pages in a book. Typically,
11 preferred controls 740 include forward and reverse page buttons 742, 741, a ball (or
12 trackball) 743 for cursor movement, one or more selection buttons 745, a current book
13 button 747 and a bookmark button 749 (see Figure 14a).

14 The controls 740 should be easy to use and conveniently located. Referring to
15 Figure 14a, the controls for the viewer 266 may be located below the screen 602 at the
16 bottom portion of the viewer 266. The next page turn button 742 is the most used button
17 740 and may be located towards the right edge of the page. The subscriber is likely to use
18 right hand thumb movements to work the controls particularly the page turn buttons 741,
19 742. Therefore, it is preferred that the buttons be arranged in such a manner that the
20 buttons are easily controlled by a subscriber's right thumb. Generally, this can be
21 accommodated either on the lower portion of the viewer 266 (as shown) or along the right
22 hand margin of the viewer 266 (not shown). The current book button 747 and bookmark
23 button 749 are usually the least used of the controls 740. Therefore, in the example
24 shown those buttons 747, 749 are located on the inside portion towards the binder of the
25 viewer 266.

26 Locating the ball 743 or other cursor movement device (such as four pointer
27 arrows -- not shown) in the bottom center of the viewer 266 is both easier for the
28 subscriber to use and easier in manufacturing the viewer 266. The selection buttons for

1 the cursor 745 are preferably located below the middle diameter of the cursor ball 743 on
2 the right and left sides of the ball as shown. If pointer arrows are used for cursor
3 movement, a selection button 745 may be located in the center of the four arrow buttons
4 (not shown). Again, the most used controls should be located where a subscriber's right
5 hand thumb would normally rest.

6 (5) Book memory 728 for at least one electronic book or more of text is included
7 in the viewer 266. The memory 728 stores text and any graphics which represent pictures
8 in a book. The memory 728 can also store menu graphics data. Two different memory
9 728 devices may be used in the viewer 266, one for the instructions for the
10 microprocessor 621 in the digital circuitry and a second type of memory may be used for
11 the book memory 728 (and graphics). Various memory devices available on the market
12 may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires
13 approximately 0.6 megabytes of storage, a small hard disk providing approximately 60
14 MBytes of storage provides memory to store approximately 100 electronic books. The
15 large hard disk drives currently available allow for storage of thousands of electronic
16 books.

17 Text for books may be displayed in various font sizes. To accommodate various
18 fonts for display, a variety of fonts are stored in instruction 732 or book memory 728.
19 Thus larger or smaller fonts may be recalled from memory 621, 728 to create displays
20 desired by the subscriber.

21 (6) Power supply circuitry 736 in the viewer 266 will accept power from
22 either an AC power source or from an optional battery 603', or the library unit 262. The
23 power supply circuitry 736 provides the necessary voltages to accommodate the various
24 systems within the viewer 266.

25 (7) An optional battery 603' is provided in a preferred embodiment. The
26 battery 603' is automatically recharged when AC power is available.

(8) An optional RF transceiver 604 which provided two-way data link between the viewer 266 and other components of the home system can also be included in the viewer 266.

(9) Also, the viewer 266 may include a cellular transceiver for mobile communications.

(10) The optional wired (attached) keyboard 267 and wireless (e.g., RF) keyboard 268 (see Figure 6a) may be used with the viewer 266 to provide communications between the subscriber and the viewer 266.

(11) The speaker and microphone 608' allow the viewer 266 to provide audio signals to the subscriber, and allow the subscriber to provide an audio input. The speaker and microphone 608' may be used in conjunction with the cellular transceiver 608 or other telecommunications equipment to provide for reception and transmission of telephony and data.

The viewer 266 of Figure 11 has parts available for providing connections to: a library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit 756 (such as that shown in Figure 6b 600'). Various electronic memory cards such as PCMCIA can be used with this viewer 266.

Security, low power consumption and excellent display technology are desired features of the viewer 266 design. The viewer 266 should be lightweight and portable. The viewer 266 contains a software operating system that allows electronic books to be stored, read and erased and includes the capability to order electronic books and retain them in memory 728 for a predefined period of time determined by the system operator. The software can be configured to allow the electronic book to be read during a period of time (i.e., two weeks) and then automatically erased, read once and erased, or held in memory permanently. Each viewer 266 has a unique key 605. All of the data storage is encrypted with the key 605 for an individual viewer 266 to prevent more than one viewer 266 accessing the text file or electronic book file.

1 Figure 12 is a flow diagram of some of the processes executed by the viewer 266.
2 Generally, the viewer 266 receives inputs from the subscriber through touch panel
3 controls 740. Alternately, the viewer 266 receives inputs from a touchscreen display, the
4 attached keyboard 267, or the remote keyboard 268. The subscriber's information
5 requests are then processed through an information request process 800 by the viewer
6 266.

7 If the subscriber requests a menu of available electronic books, a select available
8 book process 804 will select a book menu. An open file process 808 will open the
9 electronic files which list the electronic books that are available (related to the category
10 of topic of the menu) and display the menu with the names of the available electronic
11 books.

12 If the subscriber selects a particular electronic book to read, then a select a book
13 process 812 will process the selection and determine the electronic file that contains the
14 specific electronic book. An open file process 816 will open the file for that specific
15 book and normally access the first page. (If a pointer has already been set in that
16 electronic book's file, the process may default to that page.) A decision process 820 will
17 then determine which page needs to be displayed. The decision process 820 will
18 determine whether a next page, previous page or a book marked page needs to be
19 displayed. If the pointer for the electronic file is not in the correct location then a get
20 previous page process 828 will move the pointer and obtain the previous page of data
21 from the stored file. Otherwise, a get next page process 824 will normally obtain the next
22 page of text from the stored electronic file. A decrypt and decompress process 832 will
23 decrypt and decompress the text data and send the data to the video display. The video
24 display will generally have a video display memory associated with it and the decrypt and
25 decompress process 832 will send the data directly to that video display memory. The
26 circuitry for the display then completes the process of displaying the page of text.

27 If the subscriber, through the controls 740, requests (from the information request
28 process 800) that the power be turned off, then a process, 836, of turning the power off

1 will be initiated. A save pointer process 840 saves the pointer in memory to the page
2 number in the book that the viewer 266 is currently reading. A close files process 844
3 closes all the electronic files and signals the power circuitry to shut down the power to
4 the various circuits in the viewer 266. The subscriber may also use the controls 740 to
5 access other electronic files using electronic links embedded in a particular electronic file.
6 An electronic link system will be described later in detail.

7 With these examples of basic processes the viewer 266 is able to display book
8 selections and display text from those books.

9 d. Menu System

10 Referring generally to Figure 13, the delivery system 200 may have a menu
11 system 851 for selecting features and electronic books from the delivery system 200. The
12 operating software and memory required for the menu system 851 may be located at the
13 viewer 266 (e.g., the instruction memory 732 and/or book memory 728). However, it
14 may also be located at the library unit 262 (e.g., the instruction memory 632) or the
15 library unit 262 and the viewer 266 can share the software and memory needed to operate
16 the menu system 851. Since the menus are usually displayed on the viewer 266 and it is
17 preferred that the viewer 266 be capable of operating in the absence of the library unit
18 262, the basic software and memory to create the menus is more conveniently located at
19 the viewer 266.

20 The menu system 851 allows sequencing between menus and provides menu
21 graphics for graphical displays such as on the LCD display 602 of the viewer 266. In a
22 system which uses a set top converter these menus may also be displayed on a television
23 screen. In the simplest embodiment, the menus provide basic text information from
24 which the subscriber makes choices. In more sophisticated embodiments, the menus
25 provide visual displays with graphics and icons to assist the subscriber.

26 Figure 13 depicts a menu system 851 with sequencing. The primary menus in the
27 system are an introductory menu 850, a main menu 854 and various submenus 858. In
28 the embodiment shown, there are three levels of submenus 858. In certain instances one

1 or two submenus 858 is sufficient to easily direct the subscriber to the selection or
2 information requested. However, there are features in which three or more submenus 858
3 make the user interface more friendly for the subscriber. Each level of submenus 858
4 may consist of multiple possible menus for display. The particular menu displayed
5 depends on the selection by the subscriber on the previous shown menu. An example of
6 this tree sequence of one to many menus are the help submenus 887, 888. Depending
7 upon the specific help requested, a different level two help menu is displayed to the
8 subscriber.

9 An example of an introductory menu 850 is shown on Figure 14a. Generally the
10 introductory menu 850 introduces the viewer 266 to the system and provides initial
11 guidance, announcements and instruction. The introductory menu 850 is followed by a
12 main menu 854, an example of which is shown in Figure 14b. The main menu provides
13 the viewer 266 with the basic selection or features available in the system. Figure 14b
14 is an example of a main menu 854 offering many additional features and submenus 858
15 to the subscriber. For example, Figure 14b shows that the viewer 266 is able to choose
16 by a point and click method, many options including: (1) free previews, (2) books you
17 can order, (3) books in your library, (4) your current book, (5) help, (6) on-line services
18 and (6) other system features. Following a selection on the main menu 854, a
19 corresponding submenu 858 is shown.

20 Figure 13 shows thirteen available primary or first level submenus. They are (1)
21 account set up 862, (2) free previews 866, (3) book suggestion entries 855, (4) books in
22 your library 872, (5) books you can order 878, (6) your current book 884, (7) help 887,
23 (8) available features 890, (9) messages 893, (10) account information 896, (11) outgoing
24 message submenu 898, (12) show links 970, and (13) create links 980. Figure 14c is an
25 example of a first level submenu for electronic books in your library 872. This "Book In
26 Your Library" example submenu 872 shows six available electronic books by title and
27 author and provides the subscriber with the ability to check a different shelf of books 874

1 or return to the main menu 854. Figures 14d and 14e show example submenus 858 for
2 electronic books that may be ordered using the "Books You Can Order" submenu 878.

3 Figure 14f is an example of an order selection and confirmation menu 880', which
4 provides a "soft keyboard" 975 for the subscriber to use in placing an electronic book
5 order and which confirms the subscriber's order. In this particular example, the
6 subscriber is required to enter a PIN number to complete the subscriber's order. The
7 "soft keyboard" 975 could be configured as a full alpha-numeric keyboard, and may be
8 used by the subscriber to add additional information related to a book order. An alpha-
9 numeric or similar password may be used to ensure the subscriber is an authorized
10 subscriber. In an embodiment, the subscriber confirms an order with a PIN or password
11 and then receives a final confirmation screen. The final confirmation screen is primarily
12 text and may state: Your book order is now being processed via CABLE.

13 Your book will be delivered overnight and your VISA account will be charged
14 \$2.95.

15 Your book will be available for reading at 6:00AM EST tomorrow. Make sure
16 that:

- 17 1. your Library Unit and Cable Connection Unit are plugged in with
18 aerials up tonight; and
- 19 2. you tune your cable converter to THE BOOK Channel. The TV set
20 does not have to remain on.

21 or similar language.

22 Examples of the "Account Set Up Menu" 862 and further submenus 858 related
23 to account set up (which provide instructions and account input 864) are shown in
24 Figures 14g and Figure 14h. These submenus 858 allow initialization of an account at
25 the operations center 250 and orders to be charged to credit cards. The submenus 858
26 include the ability to enter data related to your desired PIN number or password, credit
27 cards, phone numbers, etc. It is preferred that the account set up be performed using the

1 telephone system. A confirmation menu verifies that the account has been properly set
2 up with the desired PIN or password and credit card.

3 Free previews for books 866 are also provided by submenus (868, 870).
4 Examples of the free preview menus are shown in Figure 14i and Figure 14j. Figure 14i
5 shows a menu depicting various electronic books for which previews are available for
6 viewing. Following an electronic book selection, a screen submenu showing an excerpt
7 of the selected electronic book cover's description is provided along with an excerpt from
8 a critic's review of the selected electronic book. In a preferred embodiment, this preview
9 screen for a particular electronic book also allows the subscriber to select a submenu
10 which provides information about the author. The book preview submenu may also
11 include a still video picture or graphics portraying a book cover or a scene from the
12 electronic book. An example of such a still video picture or graphics is shown in Figure
13 14j which depicts a preview screen 870 about the author. The video may also be
14 provided according to MPEG standards as a short moving video clip. Such a clip could
15 be an interview with the author, for example. The author's preview screen 870 shows a
16 picture of the author, provides a short biography, and may allow the subscriber to order
17 the author's books. The price for ordering the authors various electronic books may also
18 be shown on the menu. Alternatively, the previews may be provided through an
19 electronic link system, which is described in detail in copending U.S. Application Serial
20 No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC BOOK
21 ELECTRONIC LINKS, the disclosures of which is hereby incorporated by reference.

22 In addition to free previews, in more sophisticated embodiments, the delivery
23 system 200 provides the subscriber with an electronic book suggestion feature (see 855).
24 This is accomplished using the menu system 851 and the processor with associated
25 memory located at the viewer 266, library unit 262 or at the distribution point (1020 or
26 250). When necessary, information for the program suggestion feature is sent in the text
27 data of the composite or video signal to the home system 258. With this feature, books
28 or authors are suggested to a subscriber based upon historical data of the subscriber's

1 previous orders, demographics or mood of the subscriber, other indicators, and/or by text
2 word searches.

3 In a book suggestion embodiment, text word searches of preview information
4 (such as book cover descriptions, critics reviews and biographies about the author) and/or
5 text of books or other titles are performed by the library unit 262 using databases stored
6 in the library memory 600. Personalized book or author suggestions are made to the
7 subscriber by obtaining information from the subscriber indicative of general subscriber
8 interests. Subscriber entries are solicited from the subscriber preferably using the
9 electronic book suggestion entries submenu 855. The system uses these subscriber
10 entries either directly or indirectly to search for books or authors to suggest to the
11 subscriber.

12 Generally, the book suggestion methods may be categorized into two categories,
13 either responsive methods (which respond to a series of subscriber menu entries), or
14 intelligent methods (which analyze data to suggest an electronic book). Using a
15 responsive or intelligent method, the delivery system 200 determines a list of suggested
16 titles or authors and creates a second or third level submenu 856, 857 to suggest the titles
17 for subscriber selection.

18 Responsive methods of suggesting titles include, for example, the use of mood
19 questions, searching for authors, and keyword searching. Using the instruction memory
20 732 and menu generation hardware (e.g., 607) of the viewer 266, a series of mood
21 questions can be presented on menus to determine a subscribers interest at a particular
22 time. For this methodology, the operations center's 250 processor 404 and instruction
23 memory 416 assign each title mood indicators (and subindicators) from a group such as
24 light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old
25 theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent
26 to the home system 258 with the text data and are stored in library memory 600. Based
27 upon the subscriber entries, the processor 404 associates a set of indicators with the

1 subscriber's request and a set of electronic books with matching indicators are located for
2 suggesting to the subscriber.

3 Responsive searches for authors or keywords (a search word provided by the
4 subscriber) are generally performed by the library processor 628 and instruction memory
5 632 on data stored in the library memory 600. For example, a keyword given by the
6 subscriber may be searched for a match in library memory 600 storing the book reviews,
7 critics and previews databases. Thus, if a subscriber provided an entry of the word
8 "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located
9 by the library processor 628 using instruction from a routine in the instruction memory
10 632.

11 Intelligent methods of suggesting programs include analyzing personal profile
12 data on the subscriber and/or historical data about the subscriber such as past books
13 ordered by the subscriber (or buy data). This method is preferred in a book on demand
14 system and can be performed at the distribution point or operations center 250 by the on-
15 site processor 404 using subscriber databases stored in memory 428. The home system
16 258 receives the text data including program suggestion information from the distribution
17 point or operations center 250 and generates the program suggestion submenus 855, 856,
18 857 using the same text data receiving 212 and viewer menu generation hardware (e.g.,
19 607, 621) described above. Software routines and algorithms stored in instruction
20 memories (e.g. 632, 732) are used to analyze historical data and book ordered data to
21 determine a line of books to suggest to the subscriber.

22 The algorithms for this powerful feature of suggesting books or authors to
23 subscribers are disclosed in great detail in U.S. Patent No. 5,559,549, entitled
24 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON
25 A TELEVISION PROGRAM DELIVERY SYSTEM, issued September 24, 1996, and
26 are incorporated herein by reference.

27 Referring to Figure 13, submenus 858 are shown on the "Books In Your Library"
28 submenu 872 and are preferably broken into shelf numbers with submenus for each shelf

1 874, 876. The submenus 858 for the "Books You Can Order" submenu 878 is similarly
2 broken out into submenus by shelves 880, 882. These shelves may each be a category or
3 genre of books. Electronic books may be grouped into categories such as best sellers,
4 novels, fiction, romance, etc. See Figure 14d.

5 Referring to Figure 13, the submenu 858 for "Your Current Book" 884 allows a
6 subscriber to select a current book 884 and then determine what page to view. This
7 selection is confirmed with a level two submenu 885. The help submenu 887 provides
8 the subscriber with additional help screens 888. The submenus 858 for available features
9 890 are preferably broken out into a sequence of separate submenus for each feature 891,
10 892.

11 Referring to Figure 13, messages can also be sent with the delivery system 200.
12 A level one message screen provides the subscriber with the ability to select from various
13 messages the subscriber has pending 893. Each message is then shown on a separate
14 submenu screen 894, 895. The message may contain text and graphics.

15 Referring to Figure 13, account information is shown on a level one submenu 896
16 and then follow-on submenus 858 show the recent orders and your account balance 897.
17 There is also a level one submenu for outgoing messages 898 which has a follow-on
18 submenu used as an input screen 899.

19 In addition to the specific features and submenus described in Figure 13 and
20 Figure 14a through Figure 14j, many other variations and features are possible. When
21 a book is finally selected for viewing the title page 886 will appear on the screen followed
22 by a page of text.

23 III. The Billing And Collection System

24 The billing and collection system 278 (shown in Figures 2 and 3) utilizes the
25 latest technology in electronic transaction and telephone switching to track orders,
26 authorize deliveries, bill consumers, and credit publishers automatically. The telephone
27 calls initiated by the phone connector 270 are received by the billing and collection
28 system 278 which responds immediately without human intervention by placing the order

1 and charging the consumers credit card account. Data is compiled periodically and
2 publishers 282 are credited for sales of their books or other text. The billing and
3 collection system 278 may also connect with subscribers through two-way cable
4 connections, cellular, or other communication means.

5 In an embodiment, the billing and collection system 278 communicate with the
6 operations center 250 to track changes in available books and to provide statistical data
7 to the operations center 250.

8 IV. Public Library, School, and Bookstore System

9 The electronic book system can be modified to be used at public libraries, schools
10 and bookstores. Figure 15 shows one possible arrangement of components for a public
11 library, school or bookstore location. The main unit at a public library, school or
12 bookstore is the file server 900. The file server 900 is a large electronic memory unit that
13 can store thousands of electronic books. Various electronic storage means may be used
14 in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs.

15 The system comprises five components; the file server 900, a converter or video
16 connector 904, a controller 908, a viewer 912, and a catalog printer 916. The software
17 for controlling the system is primarily located in the controller 908. The converter or
18 video connector 904 is similar to those described above. In this configuration the
19 controller unit 908 monitors the data being transferred to the file server 900 by the
20 converter 904. The controller 908 is preferably provided with a viewing screen and
21 several control buttons. When it is necessary to have a larger screen to perform more
22 sophisticated controlling of the system a viewer 266 may be connected to the controller
23 908 and the viewer screen and controls 740 may be used.

24 The controller 908 is only able to download books to public viewers 912 which
25 are authorized to receive books from the particular file server 900. For security reasons
26 it is not desirable that the public viewer 912 have access to more than one file server 900.
27 In this way, security can be maintained over the text data for books. It is preferred that
28 the public viewer 912 be limited to receiving one or two electronic books at a time from

1 the controller 908. When the subscriber of the public viewer 912 needs a new or
2 additional electronic book, the subscriber returns the viewer 912 to the school or public
3 library where the subscriber receives a new electronic book from the controller 908.

4 In order to track the electronic books that are available on the file server 900, the
5 titles of the available books may be printed on a catalog printer 916. The catalog printer
6 916 is connected to the library controller 908 and the titles of the electronic books are
7 downloaded to the catalog printer 916. None of the coded text for any of the electronic
8 books can be printed using the controller 908 and catalog printer 916 of this system. In
9 order to maintain security over the data, none of the electronic book data is allowed to be
10 downloaded to the printer 916. Once a complete printout of available electronic book
11 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can
12 be maintained at the file server 900.

13 The system shown may also be used at bookstores. The bookstores can rent the
14 public viewer 912 to customers with the text for one or two electronic books loaded onto
15 the public viewer 912. The public viewer 912 may be provided with an automatic
16 timeout sequence. The timeout sequence would erase the textual data for the books after
17 a certain period of time, for example, two weeks. It is expected that after a period of time
18 (perhaps within two weeks) the renter would return the public viewer 912 to the
19 bookstore and receive additional electronic books for viewing. Using this arrangement,
20 it is also possible for the bookstore to (permanently) sell a viewer 912 to a regular
21 customer. The customer then returns to the bookstore from time to time to receive textual
22 data for an electronic book which the customer can then store permanently on the
23 customer's own viewer 912. Various other configurations are possible for bookstores,
24 schools and public libraries using the file server 900 and public viewer 912 described.

25 V. Use of a Set Top Converter

26 Existing set top converters such as those made by Scientific Atlanta or General
27 Instruments are presently unequipped to handle the delivery system 200 of the present
28 invention. Although set top converters may be built which include the library functions,

1 hardware modifications are necessary in order to use the delivery system 200 with
2 existing set top converter technology.

3 Figures 16a and 16b are examples of hardware modifications or upgrades. A port
4 is used to attach hardware upgrades described below to a set top terminal. Two upgrades
5 are possible to set top converters 601 to assist in receiving and selecting electronic books.
6 A menu generation card upgrade (Figure 16a) and an information download unit (Figure
7 16b). Each of these upgrades may be connected to the set top terminal unit through an
8 upgrade port. A four wire cable, ribbon cable, IEEE 1394 firewire interface, USB
9 interface, or the like may be used to connect the upgrade to the set top converter 601.

10 A card addition 950 to a set top converter 601 is depicted in Figure 16a. The card
11 950 shown provides the additional functionality needed to utilize the book selection
12 system with existing set top converter 601 technology. The card 950 may be configured
13 to slip inside the frame of a set top terminal and become part of the set top terminal, an
14 advanced set top terminal. The primary functions the card 950 adds to the set top
15 converter 601 are the interpreting of data signals, generating of menus, sequencing of
16 menus, and, ultimately, the ability of the subscriber to select an electronic book using
17 either the television or a viewer 266. The card 950 also provides a method for a remote
18 location, such as the cable headend, to receive information on electronic books ordered.
19 The electronic books ordered information and control commands may be passed from the
20 cable headend to the card 950 using telephone lines.

21 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic
22 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver
23 962, demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the
24 data text signal from the cable headend through the coaxial cable. The logic circuitry 958
25 of the card 950 receives data 964, infrared commands 966, and synchronization signals
26 (not shown) from the set top converter 601. Menu selections made by the viewer 266 on
27 the remote control are received by the set top converter's 601 IR equipment and passed
28 through to the card 950. The card 950 interprets the IR signal and determines the

1 electronic book (or menu) the subscriber has selected. The card 950 modifies the IR
2 command to send the information to the set top converter 601. The modified IR
3 command contains the channel information needed by the set top converter 601. Using
4 the phone line 968 and dialer 611', the card 950 is able to transmit electronic books
5 ordered information to the cable headend. It is also possible to receive the electronic
6 books over the telephone lines and by-pass the video distribution system. In this
7 embodiment, the telephone system may be used to provide access to an Internet web site
8 to order and receive electronic books.

9 These commands are passed through the interface linking the set top terminal's
10 microprocessor with the microprocessor of the hardware upgrades. In this way,
11 subscriber inputs, entered through the set top terminal keypad or remote control, can be
12 transferred to any of the hardware upgrades for processing and responses generated
13 therein can then be sent back to the set top terminal for display. In a preferred
14 embodiment the IR commands 966 are transferred from set top terminal 601 to hardware
15 upgrade.

16 Hardware upgrades may include a microprocessor, interactive software,
17 processing circuitry, bubble memory, and a long-term memory device. In addition to
18 these basic components, the hardware upgrade may make use of an additional telephone
19 modem or CD-ROM device.

20 The information download hardware upgrade 1001 (shown in Figure 16b) allows
21 the subscriber to download large volumes of information from the operations center 250
22 or cable headend using the set top converter 601. The hardware upgrade 1001 will enable
23 subscribers to download data, such as electronic books and magazines, to local storage.
24 Primarily, the hardware upgrade 1001 is an additional local storage unit 1003 (e.g., hard
25 disk, floppy, optical disk or magnetic cartridge and may include a microprocessor 1005,
26 instruction memory 1007, and a random access memory 1009, as shown in Figure 16b).
27 Preferably, a small portable viewer 266 is also provided with the upgrade 1001 to enable
28 downloaded text to be read without the use of a TV.

1 The downloadable information may be text or graphics supplied by the operations
2 center 250 or cable headend. With this upgrade, electronic books may be downloaded
3 and read anywhere with the portable viewer 266. Using this upgrade, books may be
4 downloaded and stored in compressed form for later decompression. The electronic
5 books would be decompressed only at the time of viewing. Important text that the public
6 desires immediate access may made available through this system. Text such as the
7 President's speech, a new law, or a recent abortion decision rendered by the Supreme
8 Court may be made immediately available.

9 In an embodiment, electronic book ordering information is stored at each set top
10 terminal until it is polled by the cable headend using a polling request message format.
11 An example of a polling request message format consists of six fields, namely: (1) a
12 leading flag at the beginning of the message, (2) an address field, (3) a subscriber region
13 designation, (4) a set top terminal identifier that includes a polling command/response
14 (or P/F) bit, (5) an information field, and (6) a trailing flag at the end of the message. A
15 similar response frame format for information communicated by the set top terminal to
16 the cable headend in response to the polling request may be used.

17 Figure 17 shows a preferred set top converter that includes a data receiver 617'
18 and a data transmitter 1011. The data transmitter provides upstream data
19 communications capability between the set top converter 601 and the cable headend.
20 Upstream data transmissions are accomplished using the polling system described and,
21 using a data transmitter 1011. Both receiver 617' and transmitter 1011 may be built into
22 the set top converter 601 itself or added through an upgrade module. Regardless of the
23 specific hardware configuration, the set top terminal's data transmission capabilities may
24 be accomplished using the hardware shown in Figure 17.

25 Figure 17 shows RF signals, depicted as being received by a data receiver 617'
26 and tuner 613 working in unison. Both of these devices are interfaced with the
27 microprocessor 1013, which receives inputs 1015, from the subscriber, either through a
28 set top converter's keypad, a remote control unit or the viewer 266. All cable signals

1 intended for reception on the subscriber's TV are accessed by the tuner 613 and
2 subsequently processed by the processing circuitry 1017. This processing circuitry 1017
3 typically includes additional components (not shown) for descrambling, demodulation,
4 volume control and remodulation on a Channel 3 or 4 TV carrier.

5 Data targeted to individual set top converters is received by the data receiver 617'
6 according to each set top converter's specific address or ID. In this way, each addressable
7 set top converter only receives its own data. The data receiver 617' may receive set top
8 converter 601 specific data in the information field of the signal frame described or on
9 a separate data carrier located at a convenient frequency in the incoming spectrum.

10 The received data includes information regarding electronic books and menus
11 available for selection. The subscriber may enter a series of commands 1015 using a
12 keypad or remote control in order to choose an electronic book or menu. Upon receipt
13 of such commands, the microprocessor 1013 instructs the tuner to tune to the proper
14 frequency of the channel carrying data and subsequently instructs the processing circuitry
15 1017 to begin descrambling of this data.

16 Upon selection of the electronic book, the microprocessor 1013 stores any
17 selection information in local memory (not shown) for later data transmission back to the
18 cable headend. The microprocessor 1013 coordinates all CATV signal reception and also
19 interacts with various upstream data transmission components. Typically, the data
20 transmitter 1011 operates in the return frequency band between 5 and 30 MHZ. In an
21 alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless,
22 however, of the frequency band used, the data transmitter 1011 sends information to the
23 cable headend in the information field of the response frame described. Those skilled in
24 the art will recognize that a number of variations and combinations of the above-
25 described set top terminal hardware components may be used to accomplish upstream
26 data transmissions.

1 VI. Books-On-Demand System

2 The electronic book system 200 described may also be configured in a book-on-
3 demand style. Figure 18a shows one example of a configuration for a books-on-demand
4 system. A books-on-demand system requires more powerful two-way communications
5 between the consumer's home, bookstore, school or public library and either the
6 operations center 250 or a distribution site 1020 such as the cable headend. This type of
7 two-way communication can be provided by the hardware shown in Figure 17 and
8 described above.

9 Referring to Figure 18a, in a books-on-demand system, the subscriber selects the
10 electronic book to be download from an available menu of electronic books (see for
11 example Figures 14d and 14e). The data for menus of available books is usually sent to
12 the subscriber location by the distribution site 1020. After the subscriber's menu
13 selection, information about the subscriber selection (or request) is then communicated
14 to either a distribution point 1020 (such as a cable headend or an Internet web site) or the
15 operations center 250. Upon receipt of this request, the needed textual and graphical
16 information for the book is spooled and sent to the subscriber. In this manner, books are
17 only sent when requested by the subscriber and are sent immediately upon demand for
18 the book (or text).

19 In order to support such a books-on-demand system, the text delivery and
20 distribution must be conducted on a strong nodal architected distribution system, such
21 as, a video-on-demand cable or telephone television system, an Internet web site, or
22 through use of individual telephone access on the public telephone system.

23 The books-on-demand system allows for a greater selection of electronic books
24 to the subscriber and limits the amount of communicated book data that is unnecessary
25 or unneeded. It also provides the electronic book to the subscriber in a much timelier
26 fashion.

27 In addition to a stronger distribution system, a books-on-demand system requires
28 a distribution point 1020 to have more sophisticated equipment to access and "spool out"

1 the textual information. This can be accomplished using file server technology 1024 for
2 storing the electronic books and ATM 1028 or telephone-type switching (not shown) to
3 distribute the textual information. The file server 1024 and distribution technology that
4 can be used in configuring such a books-on-demand system is described in U.S. Patent
5 No. 5,262,875 and U.S. Patent 5,218,695, cited above.

6 Figure 18a shows an embodiment for a books-on-demand system that utilizes file
7 server technology. In addition to electronic books, the embodiment of Figure 18a will
8 support distribution of nearly any digital data. Electronic books or textual files are
9 received from publishers 282 and other sources through local feeds 1032, ATM 1028, or
10 by satellite dish 1036. The data is then stored in memory 1040 at the file server 1024.
11 The distribution point 1020 may be a cable headend that receives requests from
12 subscribers and delivers text to subscribers over a two-way communication system (such
13 as a video-on-demand system (VOD) 1044). Alternately, an Internet web site may serve
14 as the distribution point 1020.

15 The library unit 262 can be connected to either a basic premium-type service cable
16 system 1048, a near video-on-demand type cable system (or pay-per-view (PPV) 1052)
17 or a video-on-demand cable system 1044. In connecting with either of these three
18 systems the library unit 262 may access the cable directly or may access the system
19 through a set top terminal 601', 601", or 601'''.

20 Using the two-way video-on-demand system 1044, a subscriber is able to request
21 a specific electronic book title and receive that text immediately following its request.
22 To accomplish this, the distribution point 1020 transmits a list of available electronic
23 books through the cable delivery system to the library unit 262. The library unit 262
24 displays the list of available electronic books on a menu or similar format. As described
25 earlier, it is preferred that the library unit 262 use menus which list categories of available
26 electronic books to form its request from the distribution point 1020. After selecting an
27 electronic book, the library unit 262 sends a request signal on the two-way
28 communication system 1044 back to the distribution point 1020. This request signal can

1 be handled in two ways. The library unit 262 either initiates the request or the
2 distribution point 1020 polls the various libraries on to the two-way system 1044. Upon
3 receiving the request for the electronic book title, the text associated with that book title
4 is transmitted to the library unit 262 using the two-way cable system 1044.

5 Figure 18b is an expanded view of a preferred operations center 250 that supports
6 a regional or national books-on-demand system. In fact, the operations center 250 shown
7 supports distribution of nearly any digital data. The operations center 250 supports
8 multiple feeds to receive digital information by tape 1060, 1060', ATM 1028, or satellite
9 1036. The information is processed through an input MUX 1064 and a small file server
10 1068 before reaching the master file server 1072. Digital data such as electronic books
11 received from publishers 282 is then stored on the master file server 1072. It is preferred
12 that the digital data is stored compressed in a standard format such as MPEG2.

13 A system controller 1076 provides control over the regional or national books-on-
14 demand system. Electronic books may be packaged into groups to provide feeds to
15 various cable headends. In addition, scheduling and marketing research are conducted
16 at the operations center 250. In order to handle the scheduling and market research,
17 electronic book buy data is received at the operations center 250 through a multiplexer
18 1082. Electronic book buy information can be provided by the operation center 250 to
19 the billing and collection system 278.

20 The operations center 250 is also equipped to insert messages or advertisements
21 into the file server. These messages or advertisements will eventually be received by the
22 subscribers.

23 The master file server 1072 uses an output multiplexer 1080 and ATM 1028 as
24 well as satellite connections to distribute digital data. In a preferred embodiment, cable
25 headends receive text data on electronic books from the master file server 1080 through
26 the output multiplexer 1028 and an ATM system 1028. After receiving the electronic
27 book data, the cable headends store the books in a local file server 1024. Figure 18a's
28 distribution point 1020 is an example of a cable headend which may receive data from

1 the operations center 250 of Figure 18b through an ATM hookup 1088 or satellite
2 hookup.

3 VII. Information Manipulation Features for Electronic Books

4 An electronic book may include various features for manipulating text or other
5 information within it. As discussed below, those features include highlighting, copying
6 and pasting, cutting and pasting, and annotating information. Other features include
7 simultaneously displaying multiple pages selected by a subscriber, displaying one or more
8 pages on a viewer having multiple screens, rotating images and sizing images.

9 Figure 19 is a flow chart of an information manipulation process 901 for
10 highlighting, cutting and pasting, copying and pasting, and annotating text or other
11 information in an electronic book. The information manipulation process 901 may be
12 implemented within the viewer 266, the library 262, or a combination. For example, the
13 image manipulation process 901 may be implemented by software modules residing
14 within the instruction memory unit 632 for execution by the library processor 628 or
15 within the instruction memory 732 for execution by the viewer processor 621, or a
16 combination. Within the information manipulation process 901, the display page module
17 or process 801 provides for displaying a page on the viewer 266. The page display may
18 be accomplished using the process shown in Figure 12 in which the subscriber selects a
19 particular electronic book for viewing. The description that follows assumes the viewer
20 processor 621 performs all software module execution steps.

21 In the select text process 803, a subscriber selects text or other information, which
22 may be accomplished by using controls 740 to manipulate the cursor to select a portion
23 of text. In particular, the subscriber may select displayed text or other information by
24 moving the cursor across the information to be selected using a trackball 743 while
25 depressing a selection button 745 (see Figure 11). Other types of selection are possible,
26 such as using a touch-sensitive screen and permitting the subscriber to select information
27 by touching the appropriate part of the screen, or using other types of cursor-control

1 devices, including peripheral devices, and selection buttons to manipulate a cursor over
2 information to be selected.

3 The viewer 266 may provide an indication of the selected text or other
4 information by showing the text or other information shaded, showing the text in an
5 alternate color, or using another type of indicator. If the subscriber selects a command
6 process 805, such as a highlight command, a highlight decision process 815 is executed
7 and the processor 621 determines if the subscriber has requested any particular type of
8 highlighting. The term highlighting refers to providing an indication of text or other
9 displayed information in order to distinguish the highlighted text from other displayed
10 information. If the subscriber has selected a highlighting option using the process 817,
11 the processor 621 alters the selected information to highlight the information according
12 to the subscriber-entered option. Otherwise, the processor 621, using a default process
13 819, alters the selected information to highlight it according to a default option. The
14 highlighted information is then stored and displayed by the processor 621 using a store
15 process 821.

16 If the subscriber entered a copy command, the processor 621, using a copy process
17 807, copies and stores the selected information as identified by the subscriber during the
18 select text process 803. If the subscriber entered a cut command, the processor 621
19 executes a remove process 809 and removes and stores the selected information. Upon
20 receiving a paste command, as determined during execution of a paste process 811, the
21 processor 621, using an insert process 813, inserts the stored information, typically at a
22 location of the cursor, and displays and stores the changes.

23 If the subscriber entered an annotate command, the processor 621, using text
24 process 823, permits the subscriber to enter a text or other annotation. An annotation
25 may include, for example, text, graphical information, still images, video clips, multi-
26 media information or an electronic link identifier. A subscriber may indicate a location
27 to enter an annotation by, for example, using the controls 740 (see Figure 14a) to select
28 text or other information to annotate under control of the processor 621 executing the

1 select text process 803. Alternatively, the subscriber, using controls 740 to position the
2 cursor, may create an annotation under control of the processor 621 using the subscriber
3 position cursor process 881.

4 Using an insert process 825, the processor 621 inserts the annotation, and displays
5 and stores the changes. The annotation is typically inserted at a location of the cursor
6 identified using the positions cursor process 881, or proximate to the selected information
7 identified using the select text process 803, so that the subscriber may choose where to
8 enter the annotation within a particular displayed page of the electronic book. The
9 subscriber may alternatively move a location of the annotation elsewhere within the page
10 by using the controls 740 to select the annotation and move the annotation to a new
11 location. The subscriber can cut, copy, and paste the annotation. Using a reposition
12 process 826, the processor 621 repositions the annotation, if moved by the subscriber.

13 Using a receive another command process 827, the processor 621 determines if
14 the subscriber has entered another command. If the subscriber has entered another
15 command, the process repeats. In addition, if the subscriber selected information to
16 annotate, the processor 621 may indicate the selected information along with the
17 annotation by, for example, highlighting the selected information or displaying the
18 selected information within a box or other type of border.

19 Figures 20-22 are examples of text screens illustrating use of the commands in
20 the information manipulation process 901. Figure 20 is an example of a text screen 1200
21 on the viewer 266 displaying highlighted text 1201. In an embodiment, the text screen
22 1200 includes a task bar 1214 having a number of sections 1215-1227 and 1231 for
23 selecting particular commands. The term section (1215-1227 and 1231) refers to a
24 definable portion of the screen, and the phrase task bar (1214) refers to a collection of
25 sections for permitting selection of various commands. For instance, a subscriber may
26 select a highlight command by manipulating the controls 740 to select the highlight
27 section 1215 using the cursor or by using a particular key stroke. A subscriber also may
28 select a menu section 1231 in task bar 1214 in order to view menus on the viewer 266,

1 such as the menus identified in Figure 13, and then may select an electronic book for
2 viewing from the menus. The act of selecting a section may involve, for example,
3 positioning the cursor or a pointer over the section using the trackball 743 and depressing
4 the selection button 745 to "click on" the section. Other cursor-control devices, including
5 peripheral devices, may be used to select a section.

6 In this example, highlighted text 1201 is shown as shaded. Other types of
7 highlighting may be used such as, for example, illustrating the text or other displayed
8 information in a different color, in a box, in a different font, in bold, in italics, underlined,
9 or in reverse video. In addition, the subscriber may highlight other types of information
10 in addition to text. The viewer 266 may present highlighting options by presenting a
11 section with options when the subscriber selects the highlight section 1215.
12 Alternatively, the viewer 266 may include a screen for setting various display and other
13 controls, which may include a section for setting highlighting options. In addition,
14 although the task bar 1214 includes the sections 1215-1227 and 1231 in contiguous
15 horizontal form, the sections of the task bar 1214 may be displayed vertically on the left
16 or right margin, scattered among the screen, or in some other geometric representation.

17 Typical cut, copy, and paste commands are illustrated by a text screen 1202
18 shown in Figure 21. A subscriber may select cut, copy, and paste commands by
19 manipulating the controls 740 (the trackball 743 and the selection button 745) to select,
20 respectively, sections 1216, 1217, and 1218 using the cursor, or by using particular key
21 strokes. The text screen 1202, which may be displayed on the viewer 266, corresponds
22 to the text screen 1200 shown in Figure 20. In this example, the highlighted text 1201
23 has been cut, copied, and pasted. In particular, the first sentence in highlighted text 1201
24 has been cut and pasted at location 1203. The second sentence in highlighted text 1201
25 has been copied and pasted at location 1204. Although these commands are illustrated
26 with text, they may apply to other information such as, for example, graphical
27 information, still images, or video clips. Although the example in Figure 21 is shown as
28 cutting and pasting, and copying and pasting, text within one electronic book, the viewer

1 266 typically may cut and paste, and copy and paste, text or other information between
2 two or more electronic books, or between electronic books and other data sources such
3 as word processing programs. When text is added or deleted from an electronic book, the
4 electronic book typically automatically repaginates.

5 Figure 22 is an example of an annotated screen 1205 on the viewer 266
6 displaying an annotation 1206 within the text. The subscriber may select an annotate
7 command by manipulating the controls 740 (the trackball 743 and the selection button
8 745) to select an annotate section 1219 using the cursor or by using a particular key
9 stroke. Upon selection of the annotate section 1219, the viewer 266 may present section
10 1206 at a location of the cursor and permit the subscriber to enter text or other
11 information into section 1206. The annotation may include text, graphical information,
12 still photos, video clips, or multimedia information. The information may include
13 subscriber-entered information, default information provided by the viewer 266, or a
14 combination. The annotation may be displayed, for example, in a box, highlighted, or as
15 codes or symbols. The annotation may cover the text beneath it, or the text beneath the
16 annotation may scroll around the annotation. Text for annotation may be created using
17 the remote wired keyboard 267 or wireless keyboard 268 shown in Figure 6a. Text may
18 also be created using a soft keyboard displayed on the viewer 266. The soft keyboard
19 may be displayed during the annotation step and may be hidden at other times.

20 Figure 23 is a flow chart of a multiple display process 903 for displaying multiple
21 pages. The process 903 may be implemented within the viewer 266, the library 262, or
22 a combination. For example, the process 903 may be implemented by software modules
23 residing within the instruction memory unit 632 for execution by the library processor
24 628 or within the instruction memory 732 for execution by the viewer processor 621, or
25 a combination. The process 903 may be used by the subscriber to view a plurality of
26 pages within an electronic book. For example, instead of viewing consecutive pages, as
27 typically presented on the viewer 266, the subscriber may wish to view non-consecutive

1 pages, such as those having related information. Therefore, the viewer 266 may display,
2 for example, on a split screen, two or more pages selected by the subscriber.

3 In the multiple display process 903, the processor 621, executing a display page
4 module or process 829, displays a page. Using a request process 831, the processor 621
5 receives a multiple page view request. A receive process 833 is used by the processor
6 621 to receive a selection of pages. In response, using a display process 835, the
7 processor 621 retrieves, formats, and displays the selected pages of the electronic book.
8 Formatting may involve reducing the size of the pages and appending them together to
9 display as one image on the viewer 266. A decision process 837 determines if additional
10 pages are selected. If so, the display process 835 again retrieves and displays the newly
11 selected pages.

12 Figure 24 is an example illustrating how two pages 1229 and 1230 may be
13 displayed simultaneously on the viewer 266 within one split-screen 1228. The subscriber
14 may select multiple page view by manipulating the controls 740 (the trackball 743 and
15 the selection button 745) to select a multi-page section 1220 in the task bar 1214, and the
16 subscriber may enter pages to view within a page section 1221 of the task bar 1214. In
17 addition, the subscriber may select pages from different electronic books for simultaneous
18 viewing by selecting the menu section 1231 to select another electronic book or other
19 information source and, if necessary, select a page by entering a page or pages in the page
20 section 1221.

21 Therefore, the subscriber may select which particular pages among any of the
22 pages in the electronic book are to be displayed on the viewer 266. Although the pages
23 are shown displayed as a side-by-side image, the pages may be displayed vertically. In
24 addition, although only two pages are shown displayed, the viewer 266 may format
25 varying number of pages to be displayed. For example, the viewer 266 may receive a
26 selection of four pages and display the four pages in four equally sized sections of the
27 viewer 266. In addition, the viewer 266 may display the page numbers along with the
28 page content. Although only text is shown, pages may contain other types of information

1 such as, for example, graphical, video, or multimedia information. When multiple pages
2 are displayed, information contained on each of the multiple pages may be manipulated
3 as described herein. For example, if four pages from an electronic book are displayed
4 simultaneously, the subscriber may elect to manipulate information on the third page. To
5 do so, the subscriber may operate the controls 740 (the trackball 743 and the selection
6 button 745) to select the third page and to then manipulate information on, or associated
7 with, the third page. For example, the subscriber may select a paragraph of text in the
8 third page, copy the text, and then scroll or drag the copied text to the first page of the
9 four displayed pages.

10 Figure 25 is a flow chart of a multiple screen display process 905 for displaying
11 pages on an electronic book viewer having multiple screens. The process 905 may be
12 implemented within the viewer 266, the library 262, or a combination. For example, the
13 process 905 may be implemented by software modules residing within the instruction
14 memory unit 632 for execution by the library processor 628 or within the instruction
15 memory 732 for execution by the viewer processor 621, or a combination. Displaying
16 images on multiple screens involves formatting one or more pages to be displayed on a
17 number of associated screens. For example, as shown in Figure 26a, an electronic book
18 viewer 266' may include three screens, 1211, 1212, and 1213. The screens may be
19 connected in a variety of positions, such as horizontally, vertically, T-shape, rectangular,
20 square, or some other geometric configuration.

21 The screens 1211, 1212, and 1213 may be physically connected by hinges 1241
22 and 1242, including electrical connections between screens for transmitting electronic
23 book content and commands. As another example, as shown in Figure 26b, a viewer
24 266" may include three screens 1211', 1212', and 1213' that snap together, or become
25 otherwise joined together, by physical and electrical connectors, as represented by arrows
26 1243 and 1244. The subscriber may select a multiple screen view by manipulating the
27 controls 740 (the trackball 743 and the selection button 745) to select a multi-screen
28 section 1222 in the task bar 1214, as shown in Figure 24, or by using a particular key

1 stroke, and the subscriber may enter pages to view within the page section 1221 of the
2 task bar 1214. At least one of the screens 1211-1213 and 1211'-1213' may include the
3 task bar 1214 for selecting a command and entering pages.

4 Referring to Figure 25, in the multiple screen display process 905, the processor
5 621, executing a display page module or process 839, displays a page. Next, using a
6 request process 841, the processor 621 receives a request for display on multiple screens.
7 Using a receive process 843, the processor 621 receives selected pages, which the
8 subscriber may specify by manipulating the controls 740. Next, in a determination
9 process 859, the processor 621 determines a number of screens in the viewer 266, which
10 may be accomplished by electronically interrogating the connections between screens to
11 determine how many screens are interconnected.

12 The processor 621 next uses a format process 845 to format the page or pages for
13 display on the multiple screens. Using the format process 845, the processor 621
14 determines the number of pages for display and compares that number with the number
15 of screens available for displaying the page or pages. If only one page was selected, the
16 processor 621 uses a first format process 847 to format the selected page for display
17 across all screens in the viewer 266. If the number of selected pages is less than the
18 number of screens, the processor 621 uses a second format process 849 to format the
19 selected pages for display. One method of formatting is to equally distribute the selected
20 pages across the screens, which involves resizing and scaling up or scaling down the
21 pages for display among the available screens. If the number of selected pages equals
22 the number of screens, the processor 621 uses a third format process 851 to format the
23 selected pages to display one page per screen. If the number of selected pages is greater
24 than the number of screens, the processor 621 uses a fourth format process 853 to format
25 the selected pages to display them equally distributed across the screens, which involves
26 resizing and reducing the pages to fit among the screens.

27 The processor 621 uses known techniques for sizing a page to fit an available
28 screen. For example, the processor 621 may apply sub-sampling routines to create a

1 thumbnail image of a page, and then may display the thumbnail image in a reduced size
2 window on a screen. For example, an electronic atlas may include many full page maps.
3 A select number of the maps may be displayed on the viewer screen by first creating
4 thumbnail images, and then arranging their display on the viewer screen. In this way,
5 several full page images may be viewed and compared in a convenient manner. For
6 example, nine full page maps from the electronic atlas may be displayed simultaneously
7 on the viewer screen. Digital data compression techniques for images (including text and
8 images) are well known and need not be repeated here. For example, *Data Compression*
9 *In Digital System*, by Ray Hoffman, (Chapman & Hall, 1977), the disclosure of which is
10 hereby incorporated by reference, describes such data compression techniques.

11 An image displayed on the viewer 266 may be scaled down by dropping, or
12 decimating, rows and columns of pixels within the image. Alternatively, each pixel in
13 the reduced-size image may be created by averaging neighboring pixels in the original
14 image.

15 To make an image larger, the existing pixels in the original image may be
16 replicated in two dimensions. However, such a scaled-up image is likely to be "blocky."
17 To avoid the blocky appearance, each pixel in the scaled-up image is created by applying
18 a color smoothing or dithering algorithm to pixels in the original image.

19 The scaling up and down may be performed with text and graphic images, and
20 with still (for example, JPEG) and moving (for example, MPEG 2) images. These and
21 other techniques may be used to display multiple images on a single screen, multiple
22 images on multiple screens and multiple images on multiple screens.

23 Once the selected pages have been resized, the processor 621, using a display
24 process 855, sends the formatted page or pages to the viewer screen(s) for display. Then,
25 using display process 883, the processor 621 displays the formatted page or pages on the
26 multiple screens of the viewer 266. The processor 621 uses decision process 856 to
27 determine the number of screens changes. This may occur by the subscriber adding
28 additional screens to the viewer 266 or removing screens from the viewer 266, if the

viewer 266 contains removable screens or the capability to deactivate particular screens. If this occurs, the processor 621 returns to the determination process 859 to determine the number of screens and then formats the page or pages accordingly. Otherwise, the processor 621 determines if additional pages are selected using decision process 857.

Figures 26c, 26d, and 26e, in which each box represents one screen, illustrate the display of a page or pages on multiple screens. If a single image 1245 represents one page, Figure 26d illustrates enlargement of the page to display the page as a first image 1246 and a second image 1247. Figure 26e illustrates enlargement of the page to display the page as a first image 1248, a second image 1249, a third image 1250, and a fourth image 1251. In comparison, if the first image 1248, the second image 1249, the third image 1250, and the fourth image 1251 together represent one page, Figure 26d illustrates reduction of the pages to display the pages as the first image 1246 and the second image 1247, and Figure 26c represents reduction of the pages to display the pages as the single image 1245. If the first image 1248, the second image 1249, the third image 1250, and the fourth image 1251 each represent one page, Figure 26e illustrates display of one page per screen, alternatively, Figure 26e shows an enlargement of a single page to four screens.

VIII. Picture-in-Picture Feature for Electronic Books

Picture-in-picture viewing permits the subscriber to simultaneously display on the viewer 266, pages or portions of two different electronic books, or content from an electronic book and another information source, such as video or multimedia information. The electronic book for viewing may be selected from electronic books stored in the viewer 266 or an associated library viewer 262, or may be obtained from a received signal. The other information source, when used, may be received using an electronic or electromagnetic signal such as a television signal, video signal, cable television signal, or wireline or wireless telephone or data source signal. For example, while viewing an electronic book the subscriber may want to simultaneously view a television program or a particular video.

1 When electronic content is obtained from memory, a system for picture-in-picture
2 viewing formats the two or more electronic books, or electronic books and other
3 electronic information, for simultaneous display. When electronic content is obtained
4 from a received signal, the viewer 266 performs necessary decoding or other processing
5 for simultaneously displaying a page of an electronic book along with the other electronic
6 information.

7 a. Picture-in-Picture Process

8 Figure 27 is a flow chart of a picture-in-picture viewing process 907 for picture-
9 in-picture viewing of electronic books and other electronic information. The process 907
10 may be implemented within the viewer 266, the library 262, or a combination. For
11 example, the process 907 may be implemented by software modules residing within the
12 instruction memory unit 632 for execution by the library processor 628 or within the
13 instruction memory 732 for execution by the viewer processor 621, or a combination. In
14 the picture-in-picture viewing process 907, the viewer 266, using a display page module
15 or process 863, displays a page of a first electronic book. Using the receive request
16 process 865, the processor 621 receives a request for picture-in-picture viewing from the
17 subscriber along with an identification of a second information source, such as a second
18 electronic book, a television signal, a video signal, still photos, content from the Internet,
19 electronic book electronic links, or multi-media information. Using a decision process
20 867, the processor 621 determines if the subscriber entered a request for a particular type
21 of picture-in-picture viewing format, which may include, for example, use of an inset
22 image or side-by-side images. If the subscriber did not enter a particular type of picture-
23 in-picture viewing format, the processor 621 uses a default process 873 to format the first
24 electronic book and content from the second information source for picture-in-picture
25 viewing according to a particular default format setting.

26 Otherwise, the library 262 or the viewer 266 formats the first electronic book and
27 the content from the second information source according to the subscriber-entered
28 option. In particular, if the subscriber requested an inset image, the processor 621, using

an inset image process 869, formats the first electronic book and the content from the second information source for displaying content from the second information source as an inset image within the first displayed electronic book. Using a reposition process 909, the processor 621 then repositions the inset image and reformats the first electronic book, if the inset image is moved by the subscriber. If the subscriber requested side-by-side images, the processor 621 uses a split screen process 871 to format the first electronic book and content from the second information source for display as side-by-side images. After displaying the picture-in-picture images, each display functions independently, permitting the subscriber to advance pages in the first electronic book, for example, by selecting the displayed image of the first electronic book. Using reverse images decision process 875, the processor 621 determines if the subscriber entered a request to reverse the displayed images. If so, the processor 621 executes a reverse format process 877 to reverse the display. The processor 621 then uses a decision process 879 to determine if the subscriber entered a request for different viewing. If the subscriber entered a different viewing request, the processor 621 returns to the decision process 867. Various multimedia experiences, programs, and displays may be created using two or more images.

Figures 28a, 28b, 28c, and 28d are examples of displays for picture-in-picture viewing. In the display of Figure 28a, a portion of a first electronic book is displayed as a main image 1207, and a portion of a second electronic book is displayed as an inset image 1208. In the display of Figure 28b, side-by-side images display a portion of a first electronic book 1209 adjacent a portion of a second electronic book 1210. In the display of Figure 28c, a portion of a first electronic book is displayed as a main image 1207', and content from a second information source, such as a television or video signal, is displayed as an inset image 1208'. In the display of Figure 28d, side-by-side images display a portion of a first electronic book 1209' adjacent to content 1210' from a second information source such as a television or video signal.

1 As shown in Figures 28a and 28c, the viewer 266 typically formats the content
2 1207 and 1207' from the electronic book so that the content 1207 and 1207' wraps around
3 the inset images 1208 and 1208', respectively, in order to display a portion of the content
4 1207 and 1207' that would otherwise be concealed by inset images 1208 and 1208'. In
5 this manner, content from the electronic book is not obstructed because the inset image
6 does not overlay the main image. This is particularly well-suited for text. In addition,
7 if the subscriber moves a location of the inset image 1208 or 1208', the processor 621
8 uses the reposition process 909 to reformat the content 1207 and 1207' to display the
9 portion concealed by the new location of the inset image 1208 or 1208', respectfully.

10 In an alternative embodiment, the main image 1207 and 1207' may be formatted
11 so that the inset images 1208 and 1208', respectively, overlay and obstruct the portion of
12 the main image at the location of the inset images. If the main image 1207 or 1207' is a
13 television or video signal, then the viewer 266 typically overlays the inset image 1208 or
14 1208' to avoid distortion of the main image as may occur with wrapping the main image
15 around an inset image. In addition, the subscriber may typically position the inset image
16 anywhere within the main image by using the cursor and the controls 740 to select and
17 move the inset image to a new location. The size of the inset image may also be changed.

18 The subscriber may select picture-in-picture viewing by manipulating the controls
19 740 (the trackball 743 and the selection button 745) to select a p-i-p section 1223 in the
20 task bar 1214, or by using a particular key stroke. In order to display an inset image, as
21 shown in Figure 28a, the subscriber may select an inset section 1225. To display the
22 electronic books as side-by-side images, as shown in Figure 28b, the subscriber may
23 select a split section 1224. The subscriber may switch between the inset view and the
24 split image view by selecting the split section 1224 and the inset section 1225 for the
25 desired view. The subscriber may reverse or swap the displayed images by selecting a
26 swap section 1226 in the task bar 1214. Upon selecting the swap section 1226, the
27 viewer 266 switches positions of the images. By selecting a normal view section 1227,
28 the subscriber may exit the picture-in-picture mode and return to normal viewing, in

1 which case the main image 1207 or left image 1209 becomes the sole displayed image,
2 for example. The subscriber may select the first and second electronic books, or the first
3 electronic book and the second information source, for viewing by selecting the menu
4 section 1231 on the task bar 1214 and selecting particular electronic books or other
5 information sources from the displayed menu.

6 b. Picture-in-Picture Tuning: Electronic Book and an Information Source

7 The viewer 266 or the home system 258 may be used to provide picture-in-picture
8 capability with one or more signals coming from an information source or a component
9 that is external to the home system 258. Figure 29a shows an embodiment of the home
10 system 258 that is intended to display multiple images in a picture-in-picture format. In
11 Figure 29a, the home system 258 comprises a single unit, namely the viewer 266. The
12 viewer 266 includes the digital logic 609, the microprocessor 621, the memory 607, and
13 the LCD 602. The functions of these components have been described previously. Also
14 included in the viewer 266 is a data connector/converter 617'. The data converter 617'
15 includes the functions of the tuner 613, data stripper 617, modem 611 and RF transceiver
16 604 described in connection with Figure 6b. The data converter 617' receives data signals
17 from wired or wireless communications paths and passes the signals to the digital logic
18 609 for processing and display on the LCD 602. The data converter 617' may for
19 example receive signals from a wireless keyboard 268, a telephone 275, a personal
20 computer 261, a video camera 273, a television 259 or a set top terminal 601. As shown
21 in Figure 29a, all of these components may communicate with the viewer 266 using
22 either wired or wireless communication paths. The viewer 266 may also receive data
23 signals from the Internet web site 279. Data signals from the Internet web site 279 may
24 be received directly from the Internet or by using the personal computer 261, for example.
25 The data converter 617' receives the data signals from one or more of the multiple sources
26 shown in Figure 29a and converts the signal into an appropriate format for display on the
27 LCD 602. The received signal may be displayed as text, a JPEG image, or an MPEG
28 image, for example. The data converter 617' may also receive audio and output the audio

1 to a speaker 608. Alternately, the audio may be converted to text and displayed on the
2 LCD 602. Text information displayed on the personal computer 261, using for example
3 a word processing program, may be sent to the data converter 617' and displayed as text
4 on the LCD 602. Television signals received at either the set top terminal 601 or the
5 television 259 may be displayed as video signals on the LCD 602. The video camera 273
6 may provide a live video feed to the viewer 266 for display on the LCD 602. Commands
7 or text typed in using the keyboard 268 may be displayed on the LCD 602. Finally, web
8 pages such as a web page available at the web site 279 may be displayed on the LCD 602.
9 The memory 607 may store programs and menus to allow the subscriber to select which
10 of the multiple information sources will provide a display on the viewer 266. For
11 example, the subscriber may decide to display an electronic book on the viewer 266 and
12 concurrently to display in a window on the LCD 602, a live feed from the video camera
13 273, and in another window on the LCD 602, a broadcast television program being
14 received by the television 259, for example.

15 Figure 29b shows an example of the multiple information sources being displayed
16 on the viewer 266. In Figure 29b the menu bar 1214 shows the menu selection 1231 and
17 the p-i-p selection 1223. The subscriber has elected to use the p-i-p function and the
18 menu bar therefore displays four window options 1244-1247. In Figure 29b the
19 subscriber has elected to play the text from an electronic book using window one 1244,
20 a television show using window two 1245 and a video feed from a video camera using
21 window three 1246. Window four 1247 is not used. The result is shown as the text in a
22 full width, upper window 1207" television show in a split with lower window 1240 and
23 a video feed in a second split window 1241.

24 There are many practical uses for the multiple screen, split screen and picture-in-
25 picture features of the viewer 266. Examples of uses of these features include, but are
26 not limited to, the following.

27 For example, while in the garage working on a vehicle the subscriber can use the
28 viewer 266 to help make a repair easier. The subscriber can use part of the LCD 602 to

1 display the instructions to make the necessary repair on the automobile, can also display
2 schematics, drawings and/or pictures of the parts, a short video on how to make the
3 repair, as well as continuously watching the video camera 273 showing the front door or
4 baby's crib.

5 When the car repair is completed, the subscriber can move the viewer to the
6 kitchen where the subscriber can have one, two or more of the following on the viewer
7 266: a list of ingredients, text of a recipe, a video on how to mix the ingredients, listing
8 of measurement conversions, and a video feed from a child's play room. More simply,
9 the subscriber can read a book in the backyard while simultaneously watching the baby's
10 playpen indoor on a video feed.

11 While this invention has been described in conjunction with the embodiments
12 described above, it is evident that many alterations, modifications and variations will be
13 apparent to those skilled in the art. Accordingly, embodiments of the invention as set
14 forth above are intended to be only illustrative. Various changes may be made without
15 departing from the scope of the invention as defined in the following claims and their
16 equivalents.

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